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JUNIOR ACTIVITIES

WHEN the name "activities" was selected for the Junior Committee which was to govern the work to be carried on by the junior membership of the A.S.T.E., it was not known how appropriate it would be, but since the formation of this committee there is no doubt but that the right name was chosen.

This committee under the leadership of its chairman, Mr. Floyd Carlson, has analyzed the needs of the society and has undertaken to fill many of these needs to a very great extent.

One of the first steps taken by Mr. Carlson after his appointment as chairman of this committee was to call a meeting of all junior members and start to formulate plans as to the method of procedure. In order that the committee could properly function it then became necessary for him to appoint various sub-committees, some of which are in charge of a chairman. Mr. George Crookston was appointed chairman of the Meetings Sub-Committee. This was a wise selection as Mr. Crookston is already serving as a member of the society's Meetings Committee.

Messrs. Kenneth Watson, Joe de Montigny and Leonard Hodges were next appointed to the Membership Committee. These three men are to be added to the society's Membership Committee, as the juniors decided they could be of more service to the society by this method than by establishing a separate committee.

In order that the juniors should be well prepared to oppose the seniors in all contests of our field meet held in connection with our picnic of June 24th, Mr. Melvin Weinberg was appointed Junior Athletic Director. That Mr. Weinberg's selection was a very good one has already been demonstrated.

Mr. Leonard Sprenger, Jr. has been selected as secretary for the Junior Activities Committee and will report all Junior meetings to the A.S.T.E. Secretary so that he, in turn, can make a monthly report in the Journal.

Mr. Tom Tomakich has been appointed to make sketches and drawings for all junior articles to appear in the Journal.

The fourth Thursday night of every month is to be known as "Junior's Night," at which time a program arranged and conducted by the juniors will be presented. These meetings will be of interest to the seniors as well as the juniors, and on behalf of the Chairman of the Junior's Activities Committee I wish to extend all senior members an invitation to attend. This is a fine way in which the seniors can show their appreciation for the good work being done by the juniors and should not be overlooked.

The third Wednesday evening of each month has been chosen for the study of problems arising in the daily work of our members. This offers an excellent opportunity for the seniors to prove to the juniors that they are still capable of solving most of the problems connected with their work. In case any member wishes to "brush up" on his mathematics he will be able to do so at these meetings. In each issue of the Journal the juniors expect to publish one or two unusual and interesting mathematical problems which will tend to keep our mathematicians in good condition. The answers to these problems will be published the month following the publication of the problem so that you can check your solution.

Many of our junior members are students of approved engineering schools, and foremost among these is the Detroit College of Applied Science. It will be remembered that the students of this school are responsible for the "birth" of this society.

It is the duty of every member of the A.S.T.E. to support this committee and its activities one hundred per cent. This can be done by taking an active interest and attending meetings, and only through this cooperation can this committee make real progress. Always remember that the junior of today is the senior of tomorrow, and by our contributions to the junior activities we strengthen our society.

PROBABLY the most note-worthy event since the last issue of the Journal has been the activities of the Meetings Committee under the leadership of Mr. J. A. Siegel. Despite the extreme temperature on the evening of our last general meeting a very pleasant and sociable time was enjoyed and the program proved very interesting. The activities of this committee in organizing his meeting, as well as the first Annual Field Day, are arousing much interest.

The Constitution and By-Laws Committee have had no particular demands for their services recently, and their progress toward revision of the Constitution and By-Laws is progressing normally.

The Industrial Relations Committee, under Bob Lippard, has been active, and this society has been fortunate in obtaining a small measure of results toward the employment of members. Satisfactory responses have been obtained from several large corporations, and efforts generally indicate that this will be one of the best committees in existence.

The Membership Committee, under Mr. F. L. Hoffman, is organizing at the present to make a drive to end up the year with additional members and to assist the Secretary and Treasurer in making collections of dues from delinquent members.

The Standardization Committees, under the general leadership of Mr. F. H. Hartlep, have established a method of operation which should provide some real results within the near future. Probably greater detail of this will be available in the next issue.

LAST MEETING

THE June meeting was held June 8th at Gentsch Hall, 6424 Gratiot Avenue. As had been heralded in the announcement of the meeting, it was very much in the nature of a "get-together" meeting and was unquestionably a success from that standpoint.

The meeting proper was held in the hall on the second floor, and the get-together portion was held in the basement. If the Meetings Committee had been able to transfer some of the atmosphere from the basement to the second floor the meeting proper might have been more enjoyable. It was unquestionably warm in the hall. Nevertheless we enjoyed the program.

The meeting was called to order by President Smila. Secretary "Al" Sargent reported the action of the Board of Directors in declining to join the Associated Engineering Societies.

A very interesting motion picture of Poland was shown. This film was well taken because it showed the family life and mode of living of the Polish farming class. Poland is largely an agricultural country. Therefore the farm life of Poland shows Poland as it is. Farm life in Poland shows quite a contrast to farm life in the United States. One caption in the picture stated that the Polish farmer goes to town on Saturdays to trade and gossip, as does the American farmer, only the Polish farmer has beer, which the American farmer has not. Some member loudly shouted, "Oh yeah!" Another scene showed two small Polish children, their dress, and method of play. Children are children all over the world. At this point we overheard a remark that the children looked like "Jake" (our speaker for the evening.)

We then had the pleasure of listening to Mr. J. C. Wohlfeld (A.S.T.E. member) tell of his trip to Russia as a member of an Engineering Commission from this country. He described the living conditions, also working and playing conditions in Russia. We got the impression that the Russian people are very similar to the peoples of other nations. Certainly they are making great progress in the development of industry. Mr. Wohlfeld had a large number of lantern slides taken in Russia which illustrated his talk.

The Russian Art Club, under the direction of Paul Serduchanky, rendered several Russian orchestral selections, which were very well received. This orchestra is made up almost entirely of mandolins and balalaikas. The Russian costumes worn by the players together with the numbers played made you think you were in Russia. Several dance numbers were given by the pupils of Miss Nina Zuk of 3015 Goodson Avenue. We liked the music and dancing and can heartily recommend this group for entertainment. They can be reached at the above address.

The "get-together" portion of the meeting came next, and we descended to the basement, where we found the atmosphere at least 20° cooler. The well-selected lunch and refreshments induced a friendly attitude among the members, and they took advantage of the occasion to enjoy it.

We hope the Meetings Committee will see fit to hold another such meeting in the future, for unquestionably the members can get acquainted better and in a shorter time in a meeting of this kind than at a regular formal meeting.

Do you sing bass?

FUTURE MEETINGS

THERE will be no meeting of the A.S.T.E. in July because of vacations, hot weather, etc.

In August a social meeting will be held at the Detroit Socialer Turnverein. All members and guests are invited. Further information on this meeting will be given in the next issue of the Journal.

The September meeting will be devoted to the subject, Steel Welded Dies and Fixtures. A demonstration and description of flame cutting and welding will be presented by Whitehead and Kales Manufacturing Company, Weldit Acetylene Company, and Westinghouse Electric and Manufacturing Company. See the September Journal for particulars.

The October meeting will feature a speaker from the engineering faculty of the University of Detroit to be announced later.

PROBLEM STUDY

Wednesday, July 19th.
Detroit College of Applied Science.
8:00 P. M.

This meeting will be devoted to the study of mathematical problems that are encountered in the daily work of A.S.T.E. members. Do not fail to bring your problem.

JUNIOR'S NIGHT

Thursday, July 27th. **Seniors invited.**
Detroit College of Applied Science.
8:00 P. M.

Speaker: Mr. Earl A. Hutton, formerly assistant chief tool designer for Hudson Motor Car Company, at present head of Centerlock drill Bushing Company, Detroit, Michigan.

Subject: Pitfalls to be Avoided in Jig and Fixture Design.

TECHNICAL

JOHN M. CHRISTMAN RAYMOND J. WALTER W. J. McKEEN

DESIGN OF HYDRAULICALLY OPERATED, AUTOMATICALLY CONTROLLED, MULTIPLE SPINDLE HEAD, DRILLING MACHINE

By RAYMOND J. WALTER

(Continued from last issue)

THERE is a wide variance of opinion regarding the strength of gear teeth, as may easily be ascertained by the study of the various rules published by different authorities, largely due to the varying conditions that must be met in gearing problems. It is a fact that no rule for the strength of gear teeth is complete unless it states definitely for what class of gears it is intended.

For cut gears, the Lewis formula is quite generally accepted as a standard. However, we cannot apply the standard formula to our particular problem, as it relates to the so-called standard tooth with involute curve and 14½° pressure angle. We are using the newer form known as the "stub tooth" with a 20° pressure angle.

Marks' Mechanical Engineering Handbook, on page 731, says, regarding the strength of stub teeth, that it cannot be computed by the Lewis formula. An 8/10 stub tooth gear is one whose diametrical pitch is 8 and whose addendum and dedendum circles are those of a standard 10 pitch gear. A stub tooth, that is, the 8/10 stub tooth will take 10/8 of the tooth gear in the ratio of the two pitches dimensioning the stub tooth, that is, the 8/10 stub tooth will take 10/8 of the load of a standard 8 pitch tooth.

Using the four following formulas based on the Lewis formula, substitute known values for

D = pitch diameter of gear in inches.
R = revolutions per minute.
V = velocity in feet per minute at pitch diameter.
Sa = allowable static unit stress for material.
S = allowable unit stress for material at given velocity.
A = width of face in inches.
Y = outline factor.
P = diametrical pitch.
W = maximum safe tangential load in pounds at pitch diameter.
HP = maximum safe horsepower.

(1) Multiply the product of the diameter in inches and the number of revolutions per minute by .262.

$$V = .262\ DR.$$

(2) Multiply the allowable static stress by 600, and divide the product by the velocity in feet per minute plus 600.

$$S = Sa \times \frac{600}{600+V}$$

(3) Multiply together the allowable stress for the given velocity, the width of face, and the tooth outline factor; divide the result by the diametrical pitch.

$$W = \frac{SAY}{P}$$

(4) Multiply the safe load at the pitch line by the velocity in feet per minute and divide the result by 33,000.

$$HP. = \frac{WV}{33{,}000}$$

For our problem we have the following results:

$$V = .262 \times 2\tfrac{1}{2} \times 306 = 200.$$

$$S = 15{,}000 \times \frac{600}{600 + 200} = 11{,}250.$$

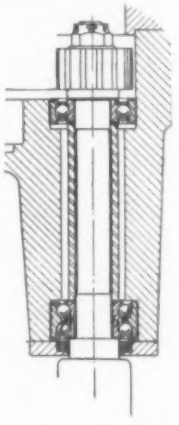
$$W = \frac{11{,}250 \times .750 \times .320}{14} = 192$$

Inasmuch as 12/14 stub teeth will carry 14/12 of the load that 14 pitch standard teeth will carry, in our fourth equation we have

$$HP. = \frac{225 \times 200}{33{,}000} = 1.3.$$

This is ample for our purpose, as may be verified by reference to any good handbook.

Next we shall determine the size shaft required for our pinion gears. Generally speaking, this shaft should not be any smaller than the size drill to be used, although, theoretically this is not true if we assume that the shearing stress of the shaft is as great as the drill itself. This is self evident, because in a half inch drill there is only from 1/8" to 3/16" of metal in the web itself, which, of course, must be strong enough to withstand the shearing stress. The size shaft required to transmit any given horsepower may readily be obtained from a handbook, but it is well to know how to calculate it. The formula I use is as follows. It is taken from page 133 of the Draftsman's Mathematical Manual.



$$d = \sqrt[3]{\frac{321{,}000 \times HP.}{RS}},$$

in which

d = diameter of shaft in inches.
HP. = horsepower to be transmitted.
R = revolutions per minute.
S = safe shearing stress of material of shaft.

If we insert the given values in the formula we have

$$d = \sqrt[3]{\frac{321{,}000 \times 1}{306 \times 10{,}000}} = \sqrt[3]{.105} = .471$$

This shows we would be safe in using a half inch shaft, but we have not considered the keyway in this instance at all. If we cut a keyway in our shaft it will materially weaken the latter. But as we have plenty of material in the gear, the root diameter being 2.1786" for a 12/14 2½" P.D. gear, we shall increase the shaft size to ¾".

(To be continued next issue)

STRENGTH OF MATERIALS

By J. M. CHRISTMAN

IN the last issue it was learned that when a bar one inch long is fixed at one end, the weight required at the other end to produce a stress of one pound per square inch in the extreme fibers is equal to the section modulus, and for common shapes this section modulus could be taken from hand book tables as shown in Figs. 1, 2 and 3.

SECTION MODULI FOR ROUND SHAFTS

SHAFT DIA IN INCHES	WEIGHT X
1	.098
2	.785
4	6.28
8	50.2

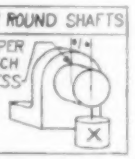


Fig. 1

SECTION MODULI OF STANDARD PIPE

PIPE SIZE INCHES	OUTSIDE DIA.	INSIDE DIA	WEIGHT X
1/4	.540	.364	.012
1/2	.840	.622	.041
1	1.315	1.049	1.33

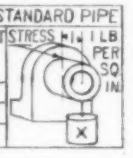


Fig. 2

SECTION MODULI OF LIGHT WEIGHT STANDARD I BEAMS

DEPTH OF I BEAM INCHES	WEIGHT X
3	1.7
4	3.0
5	4.8
8	14.2

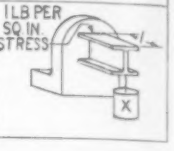


Fig. 3

Rectangular shapes are mostly encountered by tool and die designers, and it is well to remember that the section modulus is 1/6 when all the other factors are unity. See Fig. 4 and note 1 inch high, 1 inch wide, 1 inch long, and 1 lb. per square inch stress in the extreme fibers. By also remembering that the load that bars will support is proportional to their width, and loads will vary to the square of the ratio of their heights, no tables are needed for section moduli of any rectangles. For example: A bar 1 inch high by 12 inches wide will have a section modulus of ⅙ x 12 or 2; a bar 3 inches high by 1 inch wide will have a section modulus of ⅙ x 3 x 3 or 1½; a bar 10 inches high by 4 inches wide will have a section modulus of ⅙ x 10 x 10 x 4 or 66⅔; a bar ¼ inch high by ½ inch wide will have a section modulus of ⅙ x ¼ x ¼ x ½ or 1/192.

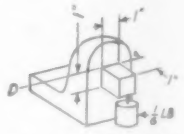


Fig. 4.—Stress of 1 lb. per sq. in. along line D.

What is the section modulus for the following:

1 inch high — 4 inches wide?
4 inches high — 2 inches wide?
12 inches high — 4 inches wide?

Check results with tables in the last issue.

Note: The table in the last issue should have been for width of 1, 2, 4 instead of 1, 2, 3 inches.

ROUND SHAFTS

See Fig. 1

(1) A round shaft is fixed at one end and is one inch long and one-inch in diameter. What weight at the free end will produce a stress of one lb. per square inch in the topmost fibre?

Answer: .098 lb. (Taken from table.)

(2) A load of 500 lbs. is hung on the free end of a round shaft which is fixed at the other end. The shaft is 2" in diameter and 36" long. What stress will be produced in the topmost fibre?

Answer: Section modulus from table = .785.

$$\text{Stress} = \frac{500}{.785} \times 36 = 23{,}566 \text{ lbs.}$$

(3) A round shaft fixed at one end is 4" in diameter and 20" long. A weight swung from the free end produces a stress of 100 lbs. per square inch in the topmost fibre. What is the weight?

Answer: Modulus for 4" diameter shaft = 6.28.

$$\text{Weight} = \frac{6.28}{20} \times 100 = 31.4 \text{ lbs.}$$

PIPES

See Fig. 2.

(4) A standard pipe of ¼" size is fixed at one end and is one inch long. What weight hung on the free end will produce a stress one lb. per square inch in its topmost fibre?

Answer: .012 lb. (Taken from table.)

(5) A standard ½" pipe fixed at one end is 2' long and has a weight of 30 lbs. suspended from the free end. What will be the stress in the topmost fibre?

Answer: Section modulus from table = .041.

$$\text{Stress} = \frac{30}{.041} \times 24 = 18{,}561.$$

(6) A standard one inch pipe fixed at one end and 3' long has a stress in its topmost fibre of 1000 lbs. per square inch. What weight hung on the free end produces this stress?

Answer: Modulus from table = 1.33.

$$\text{Weight} = \frac{1.33}{36} \times 1000 = 36.94 \text{ lbs.}$$

I BEAMS

See Fig. 3.

(7) An I beam fixed at one end and 3" deep is one inch long. What weight hung from the free end would produce a stress of one pound per square inch in its outer fibres?

Answer: 1.7 lbs. (Taken from table.)

(8) An I beam fixed at one end is 30" long and 5" deep. A load of 500 lbs. is suspended from the free end. What will be the stress in the extreme fibre?

Answer: Modulus from table = 4.8.

$$\text{Stress} = \frac{500}{4.8} \times 30 = 3125 \text{ lbs.}$$

(9) What load may be safely suspended on the end of an I beam which is fixed at the other end? The beam is 8" deep and 48" long. Assume safe compression strength of the steel to be 9000 lbs. per square inch.

Answer: Modulus for 8" depth, 14.2 stress = 9000 lbs. per square inch.

$$\text{Weight} = \frac{48}{14.2} \times 9000 = 29{,}958 \text{ lbs. or } 14 \text{ tons } 879 \text{ lbs.}$$

NEW TOOLS AND PROCESSES

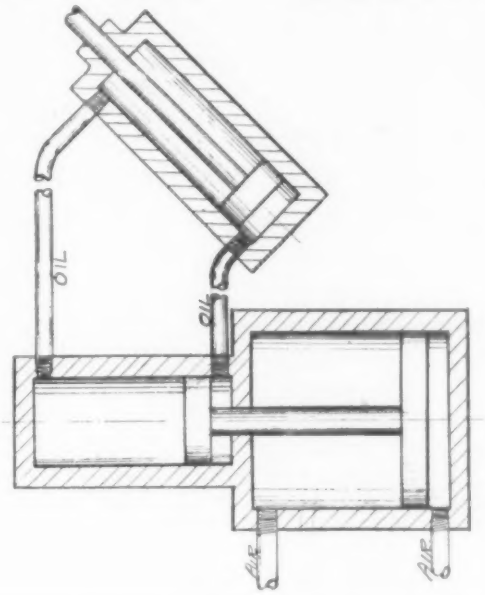
B. L. DIAMOND HAROLD GILLER

HYDRAULIC CLAMP

By B. L. DIAMOND

HERE is a sketch showing an arrangement for operating a high pressure hydraulic clamp.

This clamp may be found useful in places where it is inconvenient to use a manually operated clamp, or space does not permit the use of an air clamping cylinder powerful enough for the operation.



Briefly, the arrangement is as follows. The force from the piston rod of an air cylinder is delivered against the piston rod of a smaller oil cylinder. The total pressure of the air cylinder is therefore distributed over a smaller area, which gives us an oil supply at a pressure per square inch equal to the total pressure of the air cylinder divided by the area of the oil cylinder. This, of course, will be found to be greater than the available air pressure.

This pressure can then be used in another cylinder placed at the point most desirable for operating the clamp. For example, using a 6" air cylinder with an area of 28.274 square inches at 80 lbs. per square inch air pressure, the available force would be 2261.92 lbs. Assuming that this force is applied to the piston of an oil cylinder 3" in diameter, we find that this force is applied to a 7" (approximately) area, which gives us a pressure of 326 lbs. per square inch.

If the cylinder for operating the clamp is 3" in diameter we obtain a pressure of the clamp equal to that applied by a 6" air cylinder.

If greater pressure is required a cylinder of 6" diameter at the clamping point would give a pressure of approximately 9,200 lbs. which would require an air cylinder 12" in diameter at 80 lbs. per square inch pressure.

Obviously, the number of combinations possible is unlimited.

WELDED FIXTURES

By B. L. DIAMOND

ONE of the most interesting developments in the past few years, relative to jigs and fixtures, is the use of welded fixtures in place of the ordinary cast iron parts.

Some plants using the welded fixtures claim they have advantages over the cast iron ones. Other plants have attempted the use of welded fixtures and after the first trial have dropped them like a hot potato.

Quite obviously, the welded fixture must be designed by a man who is in sympathy with the idea of welded fixtures and built by tool makers who know how to build them. I feel that a wider knowledge of this branch of tool designing would be valuable to all of us.

Therefore I am appealing to all those who have had experience with welded fixtures to write to this Journal and tell us of your experience, so that we may pass it along to the other fellow.

Who will be the first to contribute? Let's make this column of real value to the profession.

NEW DIES

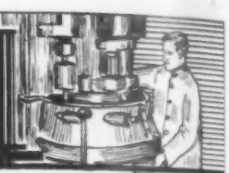
GUY M. HARTSOCK

THE revival of tool engineering activity seems to have struck with a suddenness entirely beyond the expectations of the editor of our New Dies section, Guy Hartsock. Mr. Hartsock is so deluged with work, and has so much long-continued work in prospect, that he has been forced to hand in his resignation as an associate editor of this Journal.

Readers of this Journal must be content with our apologies, therefore, for not being able to present any new die material this month. However, the appointment of a man to take Mr. Hartsock's place is being carefully considered, and we promise our readers something interesting in this section in the August Journal.

We should also like to take this opportunity to promise some material in our Standards section as soon as the Standards Committee begins to function.

NEW MACHINES



HAROLD GILLER B. L. DIAMOND

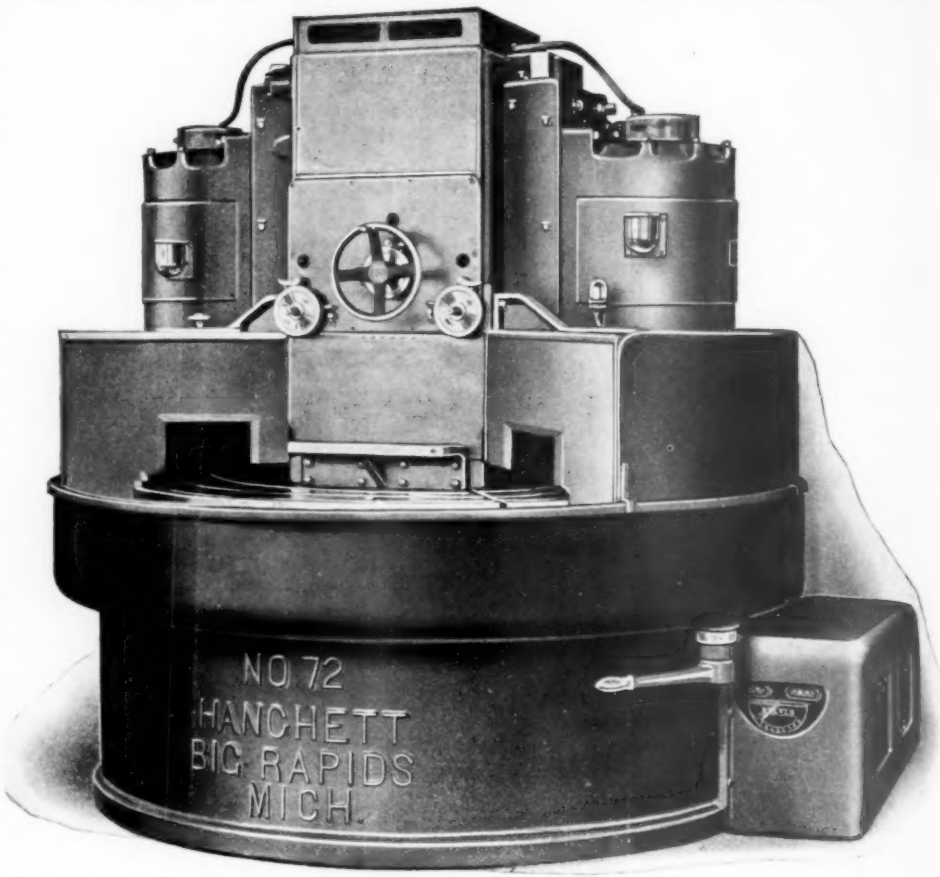
CENTER COLUMN ROTARY SURFACE GRINDING MACHINE

THE Hanchett Manufacturing Company of Big Rapids, Mich., has recently developed and now offers to the trade a new Center Column Rotary Surface Grinding Machine, which, because of the fundamental principles embodied, is extremely effective on a wide variety of high production surfacing operations. Since this machine is arranged to rough, semi-finish and finish grind at a single handling and without removing the work from the fixture, high production is easily obtained, together with close accuracy and unusually fine finish.

The table of this machine is 72" in diameter x 16" wide and is provided with three circular tee slots. Three grinding wheel heads are mounted on the center column, above the work table, and the entire arrangement is such that the working parts of the machine are readily accessible from all sides. The machine has 6" vertical feed for each wheel head and provides a 10" clearance between the work table and the wheels when they are new.

The adjustment setting for the several wheel heads is the Hanchett Manufacturing Company's standard and the same as used so successfully on all of the grinding machines built by them. It is obtained either by manual control with sight feed indicators for each head, or automatically, through which means each head feeds down continuously to compensate exactly for the amount of the grinding wheel wear.

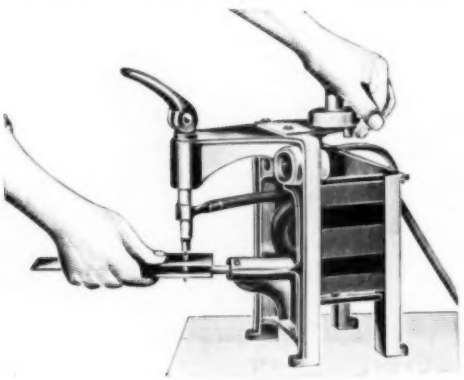
The table is mounted in circular V ways, which arrangement provides the greatest possible rigidity and eliminates all chatter and vibration. The variable speed drive provides table rotative speeds at from ¾ of a revolution to 3 revolutions per minute. This variable speed arrangement enables the user to secure all the efficiency which the wheels themselves are capable of providing.



The machine is provided with means for ample lubrication of all moving parts. Coolant is provided from a large supply tank within the bed of the machine and can be directed into the work either through the hollow spindles or onto the work and wheels from exterior sources.

Ball bearing wheel dressers are supplied for each wheel head and are so arranged that the wheels may be dressed exactly parallel with the plane of rotation.

NEW SPOT WELDERS



A PAIR of machines deserving attention have been brought out by the Superior Pattern and Manufacturing Company of Detroit, Michigan.

The welder shown in the accompanying cut uses 110 volt A.C. current and requires no special wiring. Although it weighs only 26 pounds, this welder is not of the toy class, as it can weld all sizes of sheet metals, wire, etc., up to 18 gauge, and can weld this thickness to a much heavier gauge of metal. It is a very efficient spot welder for the place in which a welder is occasionally required and on production work where the nature of the job is such that slight intervals of time between the welds are necessary, for example, on an assembling bench where other work is required in addition to the welding. Because of its slight weight it can do welding in places where the conventional type welder could not be used without disassembling.

A companion machine using 220 volt current is also made. This machine is for heavy production work. It is fully water-cooled, with three top switches to regulate the welder for various stock thicknesses up to 14 gauge. It also has a convenient floor switch allowing the operator the use of both hands.

The 110 volt machine is not regularly water-cooled, but can be supplied with water cooling at a slight additional cost.

There have been worked out a number of special attachments for various problems in spot and butt welding in both the 110 and 220 volt machines.

F. L. HOFFMAN

WE regret to announce that Mr. Hoffman was unable to find any spare time in which to prepare his copy for this issue of the Journal. He has been so busy at his job, working day and night, that it was humanly impossible for him to write another installment of his continued article on operation planning at the present time. However, Mr. Hoffman promises us some material of unusual interest and timeliness for the August issue.

E. R. DeLUIZ

The N. A. C. C., in its annual New York meeting, pledges support of President Roosevelt's recovery act and is appointing a committee to determine the desirability of adopting a trade code. The committee will have every opportunity to go into every phase of the automotive business and will report its recommendations when completed. It will probably meet with the similar committee of the N. A. D. A. to determine whether a code covering both manufacturing and merchandising should be adopted. As far as manufacturing leaders felt, the industry is already back on a firm footing and requires only small additional production for satisfactory earnings.

Reports from all manufacturers justified the statement that the automobile industry has hit the bottom of the depression and is now very definitely on the upgrade. Following are a few reports showing five increases registered by individual companies.

Buck retail sales in the first ten days of June are holding strongly, and factory executives have made two successful increases in June production schedule to a point 38 per cent above the original estimate.

Dodge dealers' retail sales are revising the seasonal trend and show that increases have been made for thirty consecutive weeks in 1933.

Studebaker and Rockne orders for passenger and commercial cars up to June 20 total 6,016 units, a gain of 59.5 per cent over total June orders received up to June 20, 1932.

For the fifth consecutive week, retail sales in DeSoto and Plymouth cars have recorded a new all time peak. Sales of Cadillac and LaSalle cars for the first ten days of June were 45 per cent greater than the first 10 days of May and 80 per cent above the first ten days of April.

Other factories to register sales increases include Hudson, Oldsmobile, Graham and Pontiac.

The University of Michigan, at its annual commencement exercises, awarded the degree of Master of Engineering to Fred M. Zeder, Chrysler vice-president in charge of Engineering, for "his encouragement of fundamental research in automotive engineering."

On the basis of May production estimates for the industry, now showing the first 5 months of 1933 ahead of the same period in 1932 by six per cent, it is reasonable to predict that production for the entire year will run close to 1,700,000 as compared to 1,434,000 in 1932.

Prices on the new American Austin cars have been increased according to a factory announcement. Price increases range from ten to twenty dollars. Commenting on the increase, R. O. Gill, president of the company, said that he felt the price increase was a very moderate one in view of the price advances in many of the commodities necessary for the building of automobiles.

The first production model of the "Dy Maxiom," radically designed passenger car, will be exhibited at the World's Fair this summer. The new car is designed to carry almost any type of standard power plant, and the drive is on the front wheels which are stationary. Steering is through the rear wheels. The body is radically streamlined, and maximum speed of 120 miles an hour is planned. Gasoline consumption of 40 miles to the gallon is also planned.

A new ventilating system, operated by means of draft deflectors, has been developed by Hupmobile and is now available on all current models. The system provides draftless ventilation in cool weather without interruption of windshield breeze. The deflectors are mounted at the leading edge of the front window, where they control the air stream created by the car in motion.

Fifty-one major Detroit plants, mainly automotive, added additional employees during the week ending June 16. Employment in Detroit is now at the highest point since February 1, as compared with a normal summer decline in other years.

A.S.T.E. NEWS

LOLA CORBIN S. R. READ

Our old friend, Andy Siarto, president of the Ace Tool and Die Company, has moved his tool shop to new and larger quarters at 3801 Trenton Avenue, where he has better facilities for handling all classes of work on tools, dies and special machinery.

Mr. A. H. Pearson can also be found at this address.

The Society wishes to take this opportunity to express appreciation to the Russian Dancers and members of the Russian Orchestra who so kindly gave their services at the party held at Gentsch Hall, on June 8th, as this background certainly lent itself splendidly to Mr. Wohlfeld's speech on Russia.

Seniors, the ladies jumped to their rescue and lent their muscle to the rope, to such good purpose that the tables were turned on the Juniors and the almost certain defeat turned into victory. Was this exactly fair? We do not pose as authorities on moral questions and will decline to answer the question.

Then came various running races, beginning with a handicap race for children of eight years or under, won by Joan Carol Smith. Susan Jones and Jean Hartlep wer second and third respectively. Lloyd Markstrom won the twelve year old boys' race. The twelve year old girls' race was won by Janet-Allen Smith. In the single ladies' race Miss Mildred Siegel placed first, and Miss Lola Corbin second.

Also, we wish to thank Messrs. F. H. Hartlep, Andrew Uetter, Hennlin and Pozniak, for the use of their cars in bringing these people to and from the hall.

The photograph on this page is one of the groups that participated in the big A.S.T.E. annual picnic and field day at Belle Isle on June 24th. The smiling, happy faces in the picture will attest to the grand time that was had by all present.

After lunch, the Junior and Senior playground ball teams took the field, and engaged in a seven inning contest. The Juniors won, 17 to 11, in a hard fought game. Herbert Royle, of the Juniors, starred with his gilt-edged pitching and terrific clouting, which had the Senior outfielders backing into the woods time and again to retrieve the ball. "Bill" Smila scored the first run for the Seniors. O. B. Jones made some spectacular fielding plays and catches that thrilled the spectators. "Joe" Siegel, on the mound for the Seniors, hurled good ball, but his support was not all it should have been, accounting for most of the Juniors' runs.

Bested at base ball, the Seniors were out to get revenge in the tug of war that followed, and they got it, with the assistance of the Seniors' wives and daughter. With the tide of battle apparently going overwhelmingly against the

The married women's race resulted in a dead heat between Mrs. Ward and Mrs. Evans. In the deciding heat Mrs. Ward won. "Lew" Wokas ambled to an easy victory in the men's race.

Two relay teams of five men each were chosen, and the relay race was won by Messrs. Forde, Hartlep, Crookston, Weinberg, and Jiggs. The personnel of the losing team was Messrs. Royle, Wokas, Carlson, Smith, and Ohman. The winner of the men's plate-pick-up race, Mr. Jiggs, received an electric clock as a prize. A similar clock was given to the winner of the married ladies' plate race, Mrs. Edward Lee.

After the athletic games, the rest of the day was spent in playing scrub and in sociability among the members and their families.

We wish to take this opportunity to express our gratitude to Haberkorn and Wood and to the Charles A. Strelinger Company for the generous donations which made it possible for the Society to give prizes to the winners in the contests at the picnic.

The outing was a smashing success as a jolly, good time was had by all, and we are sure that all A.S.T.E. members will look forward to another outing of a similar character next year.

G. F. PETERSIMES

TIME STUDY METHODS

Waste is loss to the world from which nobody receives a benefit.

TIME study is the result of the desire of management to measure accurately the capacity of equipment and to standardize methods, equipment, and cost. Elimination of waste is its objective, and this in itself erects a barrier that requires considerable effort to surmount. It is characteristic of most workmen to do only what is demanded of them. In a great many cases, the workman is upheld by his superiors in trying to defeat the time study man in his work. This is largely due to the fact that time study originally was purely an attempt to obtain greater and consequently cheaper production from the workman, without proper regard for working conditions, fatigue, etc.

Carl Barth says, "Time Study cannot be separated from motion study, and motion studies cannot be made by a person who does not fully appreciate the purpose of the motions made by the operator he observes." The fact that a man can handle a stop watch and write a legible (possibly) hand does not indicate that he is qualified to standardize the efforts of those engaged in work with which he is not familiar.

Many subterfuges have been employed by inexperienced men in trying to set a production standard on operations they were unfit to analyze. The fact that these subterfuges were resorted to is largely responsible for the unenviable position that time study holds in many industrial plants. It has caused much criticism by executives who, on almost any other angle of management and production, are fair and just.

Management has suffered great losses due to the unwillingness of some previously disillusioned executive to trust the job of standardization to an unknown "efficiency expert," who generally wants to come into the organization for six months or a year on a fat contract, and then, at the expiration of the contract (if the management can stomach him that long), walks out and leaves the place in the midst of confusion, half completed intricate false cost systems, and more than likely, labor trouble due to forcing new ideas on men without proper preparation and diplomatic presentation.

A factory manager is justified in fearing such a man.

Any operator will tackle a new job at a new rate far more willingly if that rate is pre-determined by someone whom he knows is familiar with the work and just in his intentions, and ninety nine times out of a hundred he will succeed on the job, if that type of time study man has surveyed and analyzed the job and built up its elements into the proper working total which his experience and accumulated data denotes sufficient.

Proper co-operation on the part of the tool engineer in furnishing intelligent, workable tool lineups is one of the foundations of the time study man's success.

Without a good tool engineer the time study man is a failure, and without proper time study a tool engineer will find himself without the measuring stick which he so badly needs when setting up a new program.

Time study is defined in "Managements' Handbook" as " a searching scientific analysis of methods and equipment used or planned in doing a piece of work, development in minute detail of the best manner of doing it, and accurate determination of the time required."

Such analysis of operations requires the services of men who *know*, not someone with a stop watch who depends on an operator to furnish him with sufficient information to standardize a piece of work with which he has had no previous experience. In a great many cases it has been proved that with proper analysis on the part of the time study man, much labor is eliminated in advance rather than being subjected to time study after being placed in operation with needless expense.

Time study is costly when operated by mere stop watch men. The percentage of valuable information obtained by this method is so small that its cost is enormous, due to the time required to obtain and segregate it.

A job should be surveyed, criticised, planned and replanned by both tool and time study engineer; all conditions met and estimated in advance of the actual tooling up process. Then when the job is in production various changes may be effected and finally, when everyone is satisfied, a time study should be taken and the data recorded for use in future estimates.

This method produces the best results, with the least expenditure of time and money. It also provides a check on tool engineering and prevents waste of money in tooling or purchasing unnecessary equipment. It provides standardization *before*, not after, production is under way and thereby saves enormous sums spent for wages while standards are being set up by stop watch men.

The stop watch should be used only to verify, not to precede the planning and standardization process.

(To be continued next issue)

FLOYD CARLSON

THE Junior Activities Committee announces that the following subjects will be treated at future Junior meetings. The program for the July meeting has already been given on the Meetings page of this issue.

August ..... Gauges
September ..... Die Designing
October ..... Cutting Tools
November ..... Multiple Drill Heads
December ..... Method of Manufacturing Tungsten Carbide.

Experienced and capable speakers are promised for each of the meetings, and Seniors as well as Juniors are strongly urged to be present.

PROBLEMS

THE Junnor Activities Committee is beginning this new feature in the Journal for the purpose of giving members of the Society mathematical puzzles to ponder over. We feel that the Jig-Saw craze is not for people of such high mental endowments as A.S.T.E. members, hence we hope this new section of the Journal will supply suitable intellectual recreation for them.

Here are the mental twisters.

In Fig 1 find the pitch diameter D of the driving gear of a multiple drillhead, when gear 1 has a pitch diameter of ¾", gear 2 1", and gear 3 ⅞", and A is 1½", B 2", and C 2⅛".

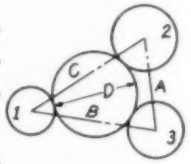


Fig. 1.

This problem was brought in by J. P. de Montigny. So far we have not seen or arrived at a solution. Anyone wishing to submit a solution will please send same to Mr. Floyd Carlson, Chairman of the Junior Activities Committee, 8203 Woodward Ave.

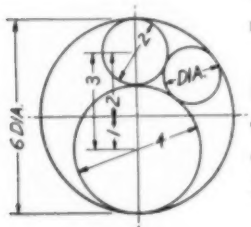


Fig. 2.

"Bill" Smila, our president, sends in the following teaser. Find the diameter of the circle that is tangent to the 2", 4", and 6" circles in Fig. 2.

Fig. 3 illustrates a problem which often confronts the tool designer. Mac M. Gallop and Russel Wainio have contributed this problem and its solution.

The tool is shown in the process of turning the valve, part of which is indicated in dotted outline. The problem is to determine the bearing radial and thrust loads on the Bell-

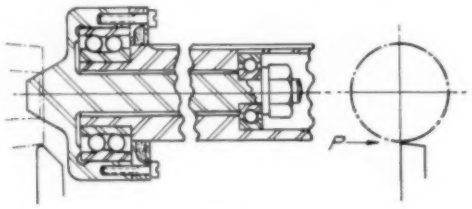


Fig. 3

type tail stock center illustrated. The method used in this case to determine the pressure on the tool bit due to turning is illustrated by the formula

$$P = AC,$$

in which A is the chip area and C a constant based on the material being cut. In this problem cast iron is being turned, and C is 130,000. Assuming a feed of 1/16" and a depth of cut of 1/16", the cross-sectional area of the chip is 1/256 square inch. Substituting these values in the formula, we have

$$P = \frac{130{,}000}{256} = 508 \text{ lbs.},$$

that is, 508 lbs. downward pressure on the tool bit.

The next step is to determine the radial load on the bearings. Fig. 4 illustrates the procedure. The greatest pressure

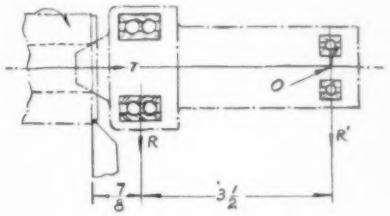


Fig. 4

is applied to the bearings at the beginning of the cut, that is, the greatest radial load will be carried by the bearings when the tool is at this point. Taking moments about the small bearing as a center (O), we have

$$3\tfrac{1}{2}\ R = 4\tfrac{3}{8} \times 508 \text{ lbs.}$$

Solving the equation, R = 635 lbs., the radial load on the large bearing. Radial load R' is found from the equation

$$4\tfrac{3}{8}\ R' = \tfrac{7}{8} \times 635$$
$$R' = 127 \text{ lbs.}$$

We next proceed to find the thrust to which the front bearing is subjected. By referring to Fig. 5 we see that 508 lbs. is acting on the conical end of the center, which is inclined 60° to the line of action of the force. The force diagram is shown at the same point. Force T will be equal to 508 lbs. × tan 30°, giving 293 lbs.

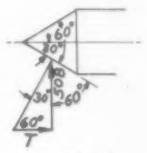


Fig. 5

Determination of the size of bearings may be made from any bearing catalog.

LAST JUNIOR MEETING

THE meeting of the Junior Activities Section of the A.S.T.E., which was held in the evening of June 22nd at the Detroit College of Applied Science, proved to be a very interesting one, giving promise of the value of forthcoming Junior meetings.

The subject "Examples of Machine Designing" which was presented by Mr. Raymond J. Walter was enjoyed by everyone. Mr. Walter illustrated by sketches on the blackboard a machine he had designed for finishing a four armed spider. He explained the problems encountered in designing, such as the accurate clamping and locating of the part, proper cutting tools and feeds to use, installation of the cooling system, and the way he obtained equalized feed of the cutters by the use of synchronized motors.

The meeting was graced by the presence and comments of Mr. Smila, President, and Mr. Sargent, Secretary of the Society.